DOCUMENT RESUME

ED 458 237 TM 033 398

AUTHOR McAllister, Catherine; Ting, Evelyn
TITLE Analysis of Discussion Items by Males and Females in Online College Courses.
PUB DATE 2001-04-00
NOTE 26p.; Paper presented at the Annual Meeting of the American Educational Research Association (Seattle, WA, April 10-14, 2001).
PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *College Students; *Computer Mediated Communication; *Discussion; Distance Education; Equal Education; Higher Education; Online Systems; *Sex Differences

ABSTRACT

Proponents of computer-mediated education suggest that the reflectivity, interactivity, and collaboration of online discussion provide an egalitarian learning environment for men and women. Others suggest that on-line discussion contains the same gender bias as face-to-face classroom communication. This study analyzed the 456 discussion postings of 34 students in 2 online college courses. Each discussion posting was analyzed for seven variables: frequency, length, readability, audience, purpose, reference, and format. Male and female discussion items differed significantly in length, use of indicators to specify a particular reader, purpose, and use of formal signature. Male and female discussion items did not differ in frequency, readability, intended audience, or references to personal experience or outside sources. From this preliminary study, a number of additional items are identified for investigation. Five appendixes contain figures illustrating points of the discussion. (Contains 10 tables and 29 references.) (Author)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 458 237

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

E. Ting

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Analysis of Discussion Items by Males and Females in Online College Courses

Catherine McAllister and Evelyn Ting

Empire State College

State University of New York

Presented at

American Educational Research Association

Seattle, WA

April, 2001

TM033398

BEST COPY AVAILABLE

Abstract

Proponents of computer-mediated education suggest that the reflectivity, interactivity, and collaboration of on-line discussion provide an egalitarian learning environment for men and women. Others suggest that on-line discussion contains the same gender bias as face to face classroom communication. This study analyzed the 456 discussion postings of 34 students in two on-line college courses. Each discussion posting was analyzed for seven variables: frequency, length, readability, audience, purpose, reference, and format. Male and female discussion items differed significantly in length, use of indicators to specify a particular reader, purpose, and use of formal signature. Male and female discussion items did not differ in frequency, readability, intended audience, or references to personal experience or outside sources. From this preliminary study a number of additional items are identified for investigation.

Analysis of Discussion Items by Males and Females in Online College Courses

INTRODUCTION

Context of the Problem

It has been suggested that the World Wide Web holds great promise for egalitarian interaction, free from such visual cues as gender, social class, and race that may limit or silence speakers. However, as communicators adapt their social and cultural discourse style to the on-line forum, they may incorporate the power relationships of face to face communication and so spoil the potential the medium offers for the democratic exchange of ideas.

As more college courses are offered in the medium, it becomes necessary to determine to what extent online discussion is shaped by the writer's gender and learned discourse characteristics. This awareness of on-line communication attributes will guide instructors in the design and delivery of classes that support full participation of all students--and may inform students of nonproductive communication styles that they may inadvertently use.

Statement of the Problem

It is the intention of this study to gather preliminary data on gender differences in computer-mediated communication in web-based college courses. Specifically, our study addresses this question: Are there differences between male and female students in the frequency, length, readability, audience, purpose, support, and format of their online discussion comments in a web-based college course?

c

Statement of the Hypotheses

The findings of Herring and others analyzing computer-mediated communication of on-line bulletin boards suggest that males and females have significantly different ways of engaging in on-line group discussion. We are interested in exploring whether this difference is demonstrated in on-line instructor-moderated course discussion, and we hypothesize that:

H1: Compared to female students, male students submit more discussion entries.
H2: Compared to female students, male students' postings tend to be longer.
H3: Compared to male students, female students' postings tend to be written in a less formal, more conversational style.
H4: Compared to male students, female students tend to make comments directed to specific coursemates more frequently.
H5: Compared to male students, female students tend to make more of their comments for the purpose of facilitating and engaging others.
H6: Compared to male students, female students tend to include more references to personal experience in their comments.
H7: Compared to male students, female students tend to present their comments in a more personal format.

Rationale for the Hypotheses

Considering the findings of Herring and others who explored male and female online discourse in electronic discussions, it is quite possible that the on-line class discussion will demonstrate similar patterns of male and female behavior.

Operational Definition of the Variables

This study examines seven dependent variables: 1. Number of discussion comments per student per discussion topic; 2. Word length of each discussion comment; 3. Readability index score; 4. Intended audience; 5. Purpose; 6. References; and 7. Format of Comment.

Operational Restatement of the Hypotheses: Predictions

It seems likely, based on the results found by prior studies, that male students will offer more frequent, longer, and more formal discussion comments than females students. It also seems quite possible that the writings of female students will demonstrate a more personal perspective, indicated by personalized format and references to personal experience. Women's writings are likely to be couched in language that affirms, develops or questions.

Significance of the Study

The purpose of this study is exploratory: the results of this study will suggestion further, more focused study. Given the rapid growth of online, asynchronous learning opportunities, an understanding of the factors affecting online learning is important. The understanding of gender differences in online discourse is necessary for instructors and course developers so that they may design learning that permits and encourages equal participation from all students.

METHOD

Subjects

The subjects were 34 students who had participated in two online baccalaureate courses at SUNY Empire State College (ESC) in Fall 1999. There were 19 females and 15 males. The average age of each group was 37 years and all but two were part time students. Demographically, this group was generally typical of Empire State College students who are primarily working adults going to school part time.

The two intact student groups were from courses selected for the preliminary study from ESC's 60 online courses. These courses were Organizational Behavior, an upper level course, and Marketing Principles, a lower level study. These courses are fundamental studies in the business curriculum and are typically taken by business and management majors, although neither study is required. Courses selected for this preliminary study were chosen based on the following considerations:

- the numbers of males and females were approximately equal;
- there was a critical mass of students for discussion (at least 12);
- there were three or more substantive discussion questions, where discussion participation was an explicit component of the final grade;

- the topic was not an area of known gender differences in work experience (e.g. Data Communications) or school experience (e.g. Advanced Quantitative Methods);
- the courses had been offered at least one time in the past, and were taught by an experienced online instructor.

Tasks and Materials

During the Fall 1999 term, students participated in the two online courses for sixteen weeks. Both courses had the standard course structure and computer interface used by Empire State College's distance learning program. Each course had 3 substantive discussion questions, each specified that discussion participation would comprise a stated percentage of the final grade, and each had stated requirements for the minimum level of participation in each discussion. Both courses had been taught at least twice previously with the same discussion questions and by the same instructors.

Students participated in the course by computer, logging on to the course web site and posting responses to both the instructor's initial question and to other students' contributions in a format known as "threaded discussion." Instructors in both courses also participated occasionally throughout the discussion threads. The course space is password protected, and students use their real names when participating. Appendix 1 shows the layout of a typical threaded discussion and Appendix 2 shows three individual discussion contributions typical in length and format.

During the course term, students also made other online submissions, not considered in this study. These included written assignments, submissions to a course shared bibliography, questions posted for the instructor, self-introductions, and casual discussion in an optional activity called the "bulletin board." Only responses to the formal, instructor-posed discussion items were analyzed in the study.

Independent Variables

The independent variables in the study were intact groups of male and female students in two courses selected by the criterion mentioned above. Potential moderator variables that might be considered included the student's prior experience with online course discussion, age, enrollment status (Fulltime or Partime) and the gender of the instructor.

Dependent Variables

Dependent variables were items measured or evaluated on each of the individual discussion contributions made by each student. The qualities of the online writing which were dependent variables were:

1. **Total Comments**. This was the number of discussion comments per student.
2. **Comment Length**. This was measured in terms of word length and sentence length.
3. **Readability level**. This was measured using both the Flesch Readability Index and the Flesch-Kincaid Grade Level Index. The Readability Index indicates the general difficulty of the text, scoring the text between 0 and 100, with 0 being the most difficult. The Flesch-Kincaid Grade Level indicates the grade level a reader would

have had to achieve to read the text comfortably. Both indexes use a mathematical formula involving word length (syllables), word counts, and sentence length.

4. **Intended Audience**. This was indicated by the clear presence or lack of a specific person named in the subject heading, in the text of the student's discussion comment, or implied by the content of the comment. Values for the intended audience were: the instructor, the class in general, a specific classmate, or a non-specified response.
5. **Purpose**. Based on the content of the comment, the primary purpose of each response was categorized: to affirm, to develop, to debate, to request restatement, to question, to give a direct response to the instructor's discussion question, or unclear.
6. **References**. Based on the content of the comment, references were identified as making references to the class text, to another student's comments, to personal experience, to the instructor's comments, to an outside expert, or not-specified
7. **Format**. This was defined by the absence or presence of three components: direct salutation, closing, or signature.

These attributes were selected because of their usefulness in assessing the degree to which the students' postings followed patterns reported in prior studies. As discussed earlier, a number of studies have suggested that male postings work to establish identity, difference and status, while female postings work to create personal interactions and community. These particular dependent variables will permit some analysis of the extent to which a posting establishes independence within the class community. For example, this would be demonstrated by longer, more formal comments without personal address, greeting or closing; by using as supporting material the work of experts or the class text; and by developing or debating prior comments. Postings working to establish interdependence in the class community would demonstrate this intent through the use of a more informal, brief, and simple style. These comments would be characterized by personal salutations to classmates and closings encouraging response; by messages that affirm, question, or request restatement (which all strengthen the communication between individuals); and by allusions to personal experience and the comments of others in the class.

Measures and Procedures

After approval from the Internal Review Board from the sponsoring institution, and the Human Subjects review panel from the institution providing the data, two courses were selected to meet specified criteria (see the Subjects section). We made copies of the course files and identified every posting with an ID which embedded the Course Identifier and the students gender (e.g., 01M01 was the first male student in course one, 01M02 the second male student in course one, etc). We had hoped the institution would supply data on gender, previous online course experience, age and enrollment status for each coded ID. Age and gender were provided for each student; however it was not possible to determine enrollment status or previous experience with web courses from the student record.

Counting total comments. Each discussion item was also given a distinct code to allow it to be sorted by author, by course, and by original question number. While specific item identifiers were not needed for the limited scope of this initial study, it was felt that they would be useful to support further analysis suggested by the outcomes of this study.

Collecting data on comment length and readability. After discussion comments were marked with unique identifiers, text was extracted and analyzed using the grammar tool available in Microsoft Word. A short Word macro simplified, although did not totally automate, this task. An example of the output from the Word Grammar analysis is shown in Appendix 3.

Coding discussion items for audience, purpose, references and format. A coding sheet was created describing the values for each item and examples of each value (Appendix 4)

To test the coding sheet and inter-rater understanding, each author coded five items using the sheet and discussed the results. Based on this "trial run" examples and clarifications were created, and some adjustments to the coding scheme were made to accommodate unplanned data. Then each discussion item was read and coded for the audience, purpose, references and format. In coding for audience, purpose and reference only the main value for each item was selected so that the responses could be mutually exclusive.

In coding for Format (salutation, closing, signature) we coded for the presence or absence of each value independently. "Salutations" were any item that used the intended recipient's name in direct address within the body of the discussion item. So an item that began "Sally:" was coded as having a salutation, while a discussion item that listed "Response to Sally" in the subject line was not. "Closings" were identified as any direct pleasantry or personal question inviting response. So concluding lines such as "Hope this helps," "What did you think" and "Thanks" were coded as closings. Emoticons (special computer punctuation communicating affect, like ;-) for a smile) were coded as closings.

Data Analysis

The data analysis of male and female discussion items was across the measured and coded variables. The goal was to determine whether previously identified patterns of male/female behavior in the traditional classroom carry over into computer-mediated communication. Basic data descriptions were generated for each item: means, standard deviation and variance for parametric data, and frequencies for other data items. T-tests were used to determine significance of differences by gender in number of comments, length of comments, and level of readability. The Chi-squared test was applied to determine if differences in categorical data were significant.

RESULTS

In all, we analyzed 456 discussion comments from 34 students in two business courses completed in a prior term, an average of 13.4 discussion comments per student. These items ranged in length from 1 word to 1100 words with an average size of 137 words. We looked at possible gender differences in the quantity and length of student responses as well as at qualitative differences in the discourse including audience, purpose, references and format.

Quantity of responses. Table 1 shows the number of responses by student and gender. The 15 male students contributed a total of 225 discussion items, an average of 15 per student. The 19 female students contributed 231 discussion items, an average of

12.1 discussion items per student. This difference in quantity of participation was not significant at the .05 level.

Table 1

Number of Discussion Items

	Male			Female		
	Mean	StdDev	Var	Mean	StdDev	Var
# items	15	9.0	81.9	12.1	10.9	120

Comment length. While the study intended to count only the number of words per response, the MS Word grammar tool returned several other measures of comment size automatically. These included number of words, number of sentences, number of paragraphs, average number of words per sentence and average number of sentence per paragraph. Table 2 shows these figures for discussion items by gender.

For both the mean number of words per discussion item and the mean number of sentences per discussion item the average for males was larger than for females. On the other hand, females had a slightly higher mean number of words per sentence, indicating the source of the additional words is more sentences, not longer sentences. Males also averaged a significantly higher number of sentences per paragraph.

Table 2

Length of discussion items

	Male			Female		
	Mean	StdDev	Var	Mean	StdDev	Var
# of words per item	**163.46**	153.50	23952	**137.4**	127.35	15866
# of sentences per item	**9.34**	8.76	79	**7.82**	6.42	40.24
# of paragraphs per item	2.62	2.37	5.84	2.36	2.22	5.04
# words per sentence	16.70	5.32	28	17.11	12.71	172
#sentences per paragraph	**4.58**	2.81	8.05	**3.94**	2.2	4.94

Standard t-tests showed that these differences were significant at the .05 level for:

- Average number of words per item

- Average number of sentences per item
- Average number of sentences per paragraph (significant at the .01 level)

The difference in average number of words per sentence was not statistically significant but does help pinpoint the source of difference in words per item.

Readability level. Each discussion item was analyzed for readability using the Flesch-Kincaid Readability score and also a grade level. Information about level of usage of the passive voice was also gathered on each discussion item (while not planned in the study, this piece of data was another unanticipated by product of the grammar checking tool). Table 3 shows the differences in these scores by gender.

Table 3

Readability

	Male			Female		
	Mean	StdDev	Var	Mean	StdDev	Var
Flesch-Kincaid readability Score	56.37	266.99	266.99	57.02	17.56	295.99
Grade level of writing	9.06	2.71	7.08	8.81	2.87	8.01
% use of passive voice	9.68 %	.13	.02	7.55%	.14	.02

Neither the raw data, nor the tests of significance indicated any differences in either the readability level or the grade level of males' and females' discussion items. Males used the passive voice in 9.68% of their sentences, compared to 7.55% for females; but t-tests from the distribution of scores indicated that this difference was not significant at the .05 level.

Intended audience and audience indicator

Student discussion items were individually read and coded for the explicit or implied audience of each discussion item. Even within the same discussion, an individual's intended audience might be the instructor, the class (as a body), or a specific classmate. Some students posted a direct answer to the instructor's initial question without any indication that they were communicating to either classmates or the instructor; these were coded "Direct answer to question." Some responses were statements that seemed devoid of audience awareness; these were coded "None." Table 4 shows the frequency and percentage of total responses directed at each of the audience categories. The Chi-square statistic for the 6x2 table is .06, which, while not itself statistically significant, might indicate some significant differences within this item.

Table 4
Intended audience

	Male		Female		
Audience	#	% (of all male responses)	#	% (of all female responses)	**ChiSq 2x2**
1 Instructor	10	4.44%	3	1.30%	0.044
2 Class	56	24.89%	61	26.41%	0.69
3 Specific Classmate	126	56.00%	140	60.61%	0.34
4 Direct answer to question	28	12.44%	26	11.26%	0.7
8 None	5	2.22%	1	0.43%	0.09
9 Other	3	0.00%	0	0.00%	0.08
Chi Square 6x2 .062746	225		231		

In addition, an attempt was made to identify any significant differences in individual response categories. The Chi square statistic was generated for each item in a 2x2 table. Data for the specific category were in one row, and the aggregate of all other responses was in the other row. An example of this 2x2 Chi square computation is shown in Table 5. The last column of Table 4 shows the Chi squared statistic generated by each item comparisons. Only the statistic for "Instructor" is significant. This might indicate the males are more likely to address the instructor, however the sample size is quite small.

Table 5
Reponses addressed to specific classmates

	Actual Value		Expected Value		
Audience	M	F	M	F	**ChiSq**
Specific Classmate	126	140	131.14	134.33	0.304
All other responses	99	91	93.862	96.67	

Reponses were also coded for the specific ways the audience was indicated in each discussion item. Students could explicitly refer to the audience/individual in the subject line of the item, or could address the audience by name within the text of the response. In many cases there was no explicit reference, but rather the audience was implied by reference to an item of discussion, or with a pronoun reference. These items were coded "implied from context." In a few cases, there was no indication who the

discussion item was addressed to; these were coded as "None." Table 6 shows the frequency and percentage with which males and females used techniques to indicate audience. The final column gives a Chi Squared value when that particular response item was looked at in isolation. Males used direct address in the text more often than females to indicate that their comments were directed at a certain person; this difference was not significant. However, females were considerably more like to use the subject line (e.g. "Response to Nadia") to identify their audience. This difference was significant at the .02 level.

Table 6
How audience is indicated in discussion item

	Male		Female		
Audience Indicator	#	%	#	%	**ChiSq 2x2**
1 Direct address in text	28	12.44%	18	7.79%	0.09
2 Indicated in subject line	68	30.22%	101	43.72%	**0.002**
3 Implied from context	110	48.89%	104	45.02%	0.48
9 NONE	19	8.44%	8	3.46%	0.02
Chi Squared 4x2 = 0.058	225		231		

Purpose

Each discussion item was coded for its primary purpose, using six identified purposes and an "other" category. There was only one primary purpose per discussion item, so the results are mutually exclusive. A Chi square test was run on the entire response set and generated a value of .0109 as shown in Table 7. This number indicates that there might be some differences in male and female behavior around this measure.

Table 7
Purpose of the discussion item

	Male		Female		
Purpose	#	%	#	%	**ChiSq 2x2**
Affirm	45	20.00%	56	24.24%	0.310
Develop	108	48.00%	81	35.06%	**0.003**
Debate	13	5.78%	9	3.90%	0.330
Request restatement	2	0.89%	6	0.00%	0.170
To question	17	7.56%	37	16.02%	**0.006**
Direct answer to instructor question	29	12.89%	35	15.15%	0.520
Other	11	4.89%	7	3.03%	0.290

BEST COPY AVAILABLE

CHI SQ 7x2 = 0.0109

In an attempt to identify significant differences in individual response categories a Chi square statistic was generated for each response in a 2x2 table with a the specific category in one row, and an aggregate figure representing all other responses in the next row. The last column of Table 7 shows the Chi square values generated by these item by item comparisons.

Men communicate with a purpose of developing the discussion more often than women and with a Chi-square of .003, this difference might be significant. Women more often question, also a statistically significant difference.

In addition, to generate more robust samples, we looked at collapsing categories based on common features. For examples, discussion items that **1. Affirm, 4. Request Restatement,** or **5. Question**, were all items addressed to individuals, rather than the class as a whole or to the professor. Table 8 shows the Chi squared statistic generated when these three behaviors are classified together.

Table 8
Communication to affirm, request restatement, question

	Actual Value		Expected Value		
Purpose, to engage others	M	F	M	F	ChiSq
1 Affirm	45	56	49.49	51.51	
4 Request Restatement	2	6	3.92	4.08	
5 Question	17	37	31.36	32.64	
Total 1,4,5	64	99	84.77	88.23	0.001
All other responses	161	132	140.23	142.77	

References

Each discussion item was coded for references made in the discussion. These could be to course materials, to another student's comments, to personal experience, to an outside expert, to the instructor's comments, NONE or Other. When a discussion item referred to more than one of these, the first was chosen. The Chi square statistic was derived on the entire response set and generated a value of .041 as shown in Table 9. Breakout of individual behaviors in 2x2 Chi squares indicated the women were more likely than men to refer to another students' comments (Chi-squared = .056) although this difference was not statistically significant. The data also indicated that male and females do not differ in the frequency with which they refer to personal experience.

Table 9
References to "outside" material and experts

	Male		Female		
Purpose	**#**	**%**	**#**	**%**	**ChiSq 2x2**
1, 5 To course text/document	40	17.78%	33	14.29%	0.36
2 To another student's comments	75	33.33%	97	41.99%	0.056
3 To personal experience	64	28.44%	68	29.44%	0.81
4 To outside expert	6	2.67%	3	1.30%	0.29
6 To instructor comment	5	2.22%	5	2.16%	0.96
8 NONE	6	2.67%	5	2.16%	0.7
9 Other	29	12.89%	20	8.66%	0.14
CHI SQ 7x2 = 0.412383					

Format

Each discussion item was reviewed for the presence of specific "format" markers identified by Herring, including distinct salutation, closing, and signature. A discussion item was coded to indicate the presence or absence of each formatting item individually. Table 10 shows the frequency of occurrence of each formatting item.

The aggregate data showed some possible variations in the use of both signatures and closing. Since some individuals used particular behaviors regularly (in fact 2 males accounted for nearly 50% of the "signature" behavior), data might be skewed by outliers. For this reason, we also looked at the number of individuals who exhibited each formatting behavior at least once in creating responses. The differences between male and female formatting behaviors is still significant, even with outliers removed. In both aggregate and individual behaviors, men tended to use the formal signature more often than women do.

Table 10
Use of Formats: Salutation, Closing and Signature

	Salutation	Closing	Signature
Males			
# items with this format	30	14	61
% items with this format	13.3%	6.2%	27.11%
# individuals who used this format at least once	9	9	10
%individuals who used this format at least once	60%	60%	66%
Females			
# items with this format	31	23	19
% responses with this format	13.42%	9.96%	8%
# individuals who used this format at least once	10	10	7
%individuals who used this format at least once	52%	52%	36%

DISCUSSION

This was a very preliminary study with a relatively small sample size. For this reason, we look at the results as a starting point for further investigation. Some of the hypothesized differences in the online discussion behavior of males and females were confirmed. On the other hand, other hypotheses generated from the literature were not confirmed by this study.

The study found no difference in the quantity of discussion responses submitted by men and women. In fact the frequency distribution of number of discussion items submitted for the two groups seemed quite similar. This equity of discussion does not support some prior studies that found on-line discussions to be dominated by men or found that males made more postings than females (Herring 1993, 1996; Ferris 1996; Blum 1999). In fact, both the average number of postings and relative frequency seem quite equitable. The presence of an authority figure (the instructor) may curb inclinations toward increased levels of activity designed to exert dominance. It is also possible that the similarity in quantity of discussion items is due to the structure of this online discussion. The fact that the discussion items are designed and mandated as activities in a

credit-bearing course may be a "leveling" factor in terms of how often students choose to participate, although Ross (1998), also analyzing a classroom situation, found that men did participate more frequently than women.

While there were no apparent differences in the quantity of comments submitted, there was a significant difference in the mean length of comments, measured in number of words. Comments from male students had a mean word length of 163, while the mean for females was 137. This difference was significant at the .05 level. Closer inspection of related data revealed that this difference was due to the fact that males tended to submit more sentences per response than females. The mean number of sentences per item was 9.3 for males and 7.5 for females. This difference was also significant at the .05 level. This observation was particularly interesting since sentences written by females contained more actual words than those submitted by males (mean words per sentence for females was 17.11, for males 16.69), although this difference was not statistically significant. So even though females wrote slightly longer sentences, males wrote more sentences which created longer discussion items. This finding follows earlier study that showed that male postings tended to be longer than female postings (Herring 1993; McConnell 1997; Blum 1999), and more generally supports studies indicating that men speak more than women in college classes (Kramarae & Treichler, 1990; Pearson, West, & Turner, 1995). However, the stylistic difference of sentence length is difficult to explain without further linguistic analysis. It is possible that postings with shorter sentences are employing a more curt, business-like style, while postings with longer sentences are using a relaxed, more expansive conversational style.

The hypothesis that there would be differences in either readability level or grade level of writing was not confirmed. Our hypothesis was based on the idea that male postings, if indeed working to achieve status, would demonstrate a more elevated structure and vocabulary. However, males' responses and females' responses were very close in this area. One might expect the two groups to be more similar, first because they were college students at approximately the same level, and second because the groups were also similar in terms of age, both mean age and age distribution. In addition, it is possible that in the structure of the college on-line class, a particular level of discourse is established early in the discussion; this particular degree of elevation or informality might be used as the class standard. In fact instructors are told to "model" the appropriate level of discussion early in their course by giving examples of good discussion items or acknowledging items that model the level the instructor hopes for the course. Further broad study would be needed to support this suspicion.

The review of the literature indicated that males and females might differ in their choice of audience for discussion. If females work to establish and support interpersonal relationships, as many studies suggest, it would follow that this would be evident in their use of communications directed to particular individuals. We looked at both what the intended audience was for each discussion item, and how the audience was indicated. Males were more likely to address the instructor directly and the difference was statistically significant at the .01 level, although the sample size was small.

We hypothesized a significant differences in the frequencies with which females and males addressed individual coursemates, as opposed to the full class or the instructor. These qualities of communication would be understood to demonstrate a female interest in the interpersonal and cooperative relationships in the group. However,

no such difference was observed. Male's and female's discussion items were similar in terms of how often they addressed their responses to individual classmates and how often their discussion was addressed to the class in general. While we did not run the Spearman test for correlation, the raw rank ordering of the outcomes shows virtually no differences. However, we should investigate this finding further, with particular attention to the coding process.

Females were more likely to explicitly address course discussion items to a particular coursemate. The vehicle for this was generally the subject line of the response (as in "Response to Carrie"). This Chi square statistic for this difference was significant at the .01 level. The general finding would be expected from women's needs to make connections and create rapport with others (Gougeon, 1998). It can be suggested that this direct naming of the recipient emphasizes and develops the personal quality of the message, so supporting prior study establishing a female tendency toward communication that builds community. An unexpected observation was that males were more likely than females to address an individual directly within the body of the response.

Prior research in online discussion and gender related behaviors suggest that men and women comment with different purposes: women to support and encourage, and men to challenge or refute. In our study we expected to find that female students were more likely to communicate for the purpose of affirming another student's response, requesting clarification or questioning another student ("Do you mean....?", "How did you feel about that....?") etc. We expected men to be more concept directed or goal directed with respect to the topic (Kramarae and Treichler, 1990; Eakins and Eakins. 1978) and more likely to debate (Kramarae and Treichler; 1990, McConnell, 1997). We did find that men were more likely to communicate with the purpose of developing discussion on the question, and this difference is significant at the .01 level. We also found that females were more likely to communicate for the purpose of questioning another student to get more clear information. This finding follows the findings of Herring (1993, 1996) Ferris (1996), Gougeon (1998), and (Blum 1999); however, the finding is not as strong as we had anticipated. By collapsing categories for this item (1. Affirm, 4. Request Restatement, and 5. Question) as three "relationship" variables and "Develop" and "Debate" as "task" variables, we would find that the statistics are significant for each group.

Several studies have indicated that females were more likely than males to refer to their personal experiences in online discussion. In this study, however, we found that male and female students were equally likely to refer to their personal experiences. Two factors might explain this similarity. First, as a self-selected group (baccalaureate students taking business studies) the students were more similar to each other in terms of work experience and college experience than a random group. Second, business courses in the institution promote the idea of tying learning to life experiences, so students may have had external motivation to incorporate references to experience in their discussion items. On the other hand, any very extensive reference to personal issues in the public class discussion would have been inappropriate—just as it would be in a classroom. The well-defined context of the discussion may control the degree of self-disclosure—and the particular facets of such disclosure—for both male and female participants

Our research showed that male responses had nearly four times as many formal signatures as those by women. Closer inspection of the aggregate data showed that two outlier individuals accounted for over ½ of the signatures. However, even counting these individuals, nearly twice as many males as females used the formal signature at least once. This is particularly interesting as another finding discussed earlier indicated that women were more apt to specifically name the recipient of their posting in the subject or text. It might seem that a writer who makes a direct address to the reader, an epistolary convention, would also follow such epistolary convention and "sign" the message. The fact that this is not the case requires an alternate explanation. It may be that—following the familiar dichotomy of women communicating to create community and men communicating to create autonomy—our findings are not surprising. In establishing ties to others, women name the others; in establishing independence and difference, men name themselves. This is speculative, but would explain this apparent contradiction in message format. Again, further detailed study would permit the validity of such a suggestion to be established.

CONCLUSION

From this very preliminary study, it appears that male and female behavior in online courses may differ somewhat from discourse behavior in other online discussion forums. While male postings are longer, they are not more frequent. Females appear to communicate more frequently for relationship building and males for task orientation. Males do appear to use their formal signature more often.

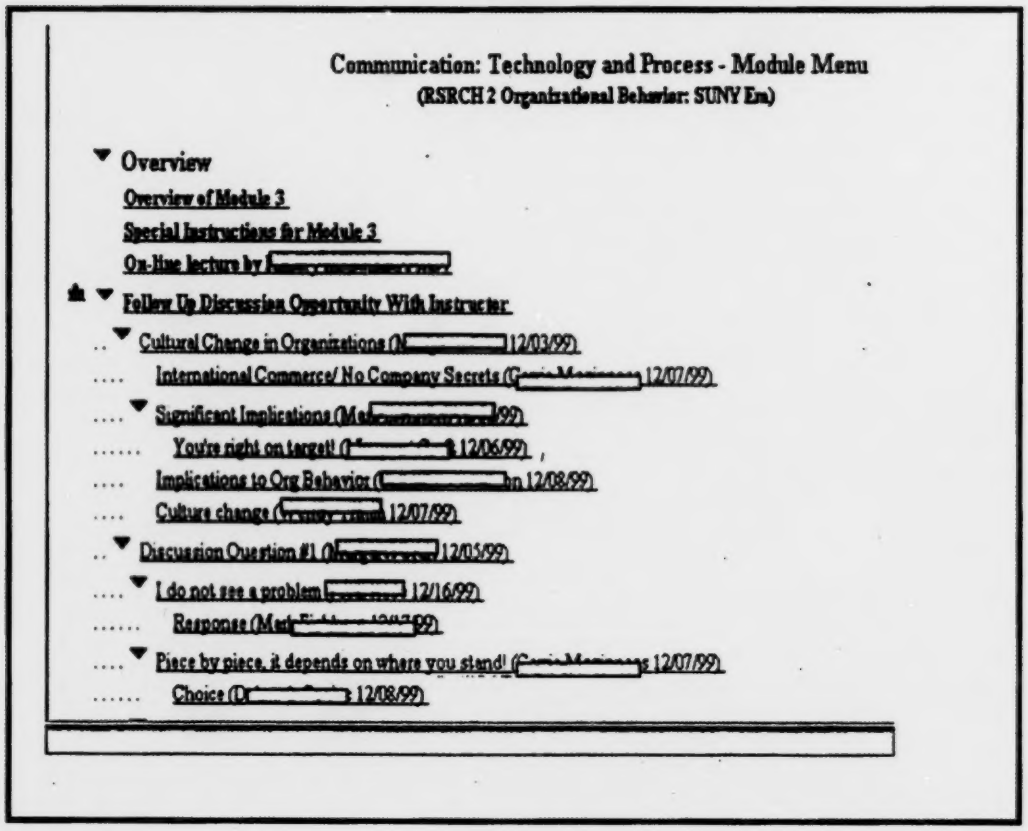
This preliminary study certainly raised a number of additional items for study. The most significant is related to the moderator variable, age. Unfortunately age data was not provided from the institution's administrative system in time for analysis. However, the raw data (Appendix 5) indicates that age may play an important moderator role. Older males and older females appear to resemble each other more closely that older males resemble younger males or older females resemble younger females. This bears investigation.

The methods also left room for refinement. A cursory look at the effects of the moderator variables makes age seem to be significant. This item requires further study. Also, this study did not distinguish between the behaviors of "completers" and "non-completers." Larger data sets and separation of the discussion items by whether or not the student satisfactorily completed the course might also be important. Use of additional computer analysis tools, such as the NU*DIST discourse analysis software, would allow study of larger data sets with more objective analysis.

One incidental observation found that the tendency to use "creative punctuation" (such as ??, ;-), and CAPS) and "Non standard language" was predominantly in female discussion entries. It also became clear that a number of apparent gender-related traits referred to in the literature survey should be studied in these courses, including thread patterns (who responds to whom), and more detailed content analysis.

In short, this data is rich with opportunities to identify ways that gender may affect students' participation in online learning.

Appendix 1
Layout of a typical threaded discussion


Communication: Technology and Process - Module Menu
(RSRCH 2 Organizational Behavior: SUNY Em)
Overview
Overview of Module 3
Special Instructions for Module 3
On-line lecture by
Follow Up Discussion Opportunity With Instructor
Cultural Change in Organizations (M 12/03/99)
International Commerce/ No Company Secrets (12/07/99)
Significant Implications (Ma /99)
You're right on target! (12/06/99)
Implications to Org Behavior (n 12/08/99)
Culture change (12/07/99)
Discussion Question #1 (12/05/99)
I do not see a problem (12/16/99)
Response (Mar /99)
Piece by piece, it depends on where you stand! (s 12/07/99)
Choice (D 12/08/99)

BEST COPY AVAILABLE

Appendix 2

Three individual discussion contributions typical in length and format.

Subject: I do not see a problem

After reading the Microsoft case, I can honestly say that i do not have a problem with how they do business. They clearly have a defined goal or mission to be the worlds largest and exclusive provider of operating systems. In fact, I view them no differenly thatn any other major corporation striving for market dominenance. For example, a few years ago, the Chrysler Motor company revloutionized the automobile industry with the radicle cab forward design. Soon after unveiling this concept, the other big 2 car manufactures began encorporating this design into their manufacturing process because of the great success Chrysler had with it. From this instance Microsoft is no different. It continues to lok for new and exciting products which Microsoft feals will further add to the demand of their operating system. In fact, you could say that Microsoft makes decsions using the Herbert Simon model (Luthans p.491) in the sense that they search for new products or ideas, then decided wheather to manufacture or a
equire. In fact, I would make the argument that Microsft is simplying doing what Japanese manufactures have been doing for years reverses engineering, taking an existing product and making it better.

Subject: Initial Response

M[redacted]

My initial response after reading the K[redacted]an case is one of sour grapes on Dr. Mc[redacted]'s part. The case seems to portray Microsoft as a bully, non-inventive, technology thieves and general predator against all that is good with free market forces.

Yep...seems change is needed or all the bleeding hearts in America will carve Microsoft up with nothing left but a disconnected mouse and no pad underneath. Do we have a "perception problem" here?

M[redacted]

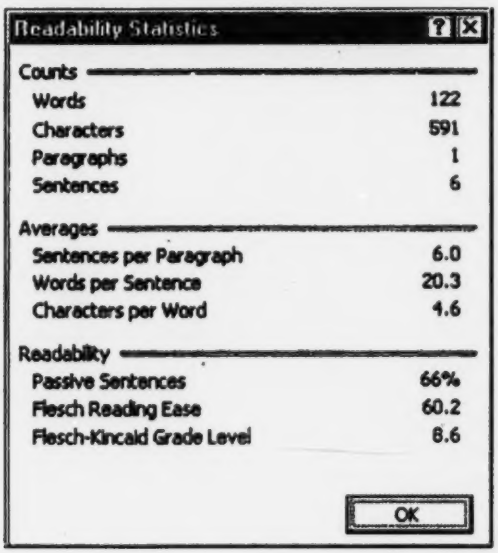
Subject: As they say in Maine Uyuh!

Perception is just one of the problems Microsoft will face. One would be amazed at the "theories" that are developing. The latest I heard was that Microsoft is working for the government, soon they will be able to "get inside" each of our homes through our PC. Another is that Bill Gates is really a ET and wants PC in our homes and schools to gain control of the Planet. Now both of these are really extreme examples from some company cartoons. Unfortunately, our inherant fear of "too much power" is very real. The everyday person fears the controlling hands o big business, and Microsofts competition, or whats left of it will use the Monopoly label to control the perception of the general public. Free market, well it will be a real test of the marketing machine of Microsoft to see if they can alter the perception in their favor.

BEST COPY AVAILABLE

Appendix 3

An example of the output from the Word Grammar analysis



Appendix 4.

Coding Sheet

Item and description	Values
Intended Audience Indication of the primary intended reader of the discussion comment. Indicated by specific name, or implied by the content or context of the comment. Values for the intended audience were: question, or unclear.	1. the instructor 2. the class in general 3. a specific classmate 4. direct answer to assigned question 8. NONE, non-specified response. 8. other
How audience is indicated Is this communication directed to a particular course member, to the instructor, or to the whole class	1. Direct address in text 2. Indicated in subject line 3. Implied from context 8. NONE
References. Based on the content of the comment, references were identified as making references to	1. the class text or 5. materials 2. to another student's comments 3. to personal experience 4, to an outside expert 6. to the instructor's comments 8. NONE 9. other
Purpose. What was the student doing in this comment	1. to affirm 2. to develop 3. to debate 4. to request restatement 5. to question 6. direct response to instructor's discussion 8. not clear
Format. This was defined by the absence or presence of three components	Direct salutation, Closing, Signature None

Appendix 5.

Age as a potential moderating variable

AUDIENCE

Female

Younger <37		Older >=37		
%	#	#	%	
5.10%	0	3	2.1%	Instructors
30.57%	26	35	24.3%	Class
48.41%	49	91	63.2%	Specific Classmate
12.74%	12	15	10.4%	Direct answer to question
3.18%	1	0	0.0%	None
0	0	0	0.0%	Other
	88	144		

Male

Younger <37		Older >=37		
#		#	%	
4.4%	2	8	2.9%	Instructors
24.8%	8	48	11.6%	Class
55.8%	50	76	72.5%	Specific Classmate
12.8%	9	20	13.0%	Direct answer to question
2.2%	0	5	0.0%	None
0.0%	0	0	0.0%	Other
	69	157		

References

Allen, B. (1995). Gender and computer-mediated communication. Sex Roles: A Journal of Research, 32 (7-8), 557-564.

Blum, K.D. (1999). Gender differences in asynchronous learning in higher education: Learning styles, participation barriers and communication patterns. Journal of Asynchronous Learning Networks, 3 (1), 20 pps.

Dyrud, M.A. (1997). An exploration of gender bias in computer clip art. Business Communications Quarterly, 60 (4), 30-52.

Bromley, H., & Apple, M.W. (Eds). (1998). Education/technology/power: Educational computing as a social practice. NY: SUNY.

Eakins, B.W., & Eakins, R.G. (1978). Sex differences in human communication. Boston: Houghton Mifflin, Co.

Evard, Michele. (1996). "So please stop, thank you": Girls online. In L. Cherny & E.R. Weise (Eds.), Wired_women (pp.188-204). Seattle, WA: Seal Press.

Fassinger, P.A. (1995). Understanding classroom interaction: Students' and professors' contributions to students' silence. Journal of Higher Education, 66 (1), 82-98.

Gefen, D., & Straub, D. W. (1997). Gender differences in the perception and use of e-mail: An extension to the technology acceptance model. MIS Quarterly, 21 (4), 389-400.

Gougeon, T. (1998). Gender sensitive instruction: A distance education issue. Paper presented at the annual meeting of the American Association for Adult and Continuing Education, Phoenix, AZ. (ERIC: ED 428 269)

Herring, S. (1993). Gender and democracy in computer-mediated communication. Electronic Journal of Communication [Online] 3 (2). Available via e-mail message addressed to Comserv@cios.org. Message: Send Herring V3N293

Herring, S.C. (1996). Bringing familiar baggage to the new frontier: Gender differences in computer-mediate communication. In V.J. Vitanza (Ed.), CyberReader (pp. 144-154). Needham Heights, MA: Allyn & Bacon.

Herring, S.C. (1996). Two variants of an electronic message schema. In Herring, S.C. (Ed.), Computer-mediated communications: Linguistic, social and cross-cultural perspectives. Philadelphia, PA: John Benjamins.

Herring, S.C. (Ed.). (1996). Computer-mediated communication: Linguistic, social, and cross-cultural perspectives. Philadelphia : J. Benjamins.

Jaffe, J.M., Lee, Y.E., Huang, L., & Oshagan, H. (1995). Gender, pseudonyms, and CMC: Masking identities and baring souls. Paper presented at the annual meeting of the International Communication Association, Albuquerque. [On-line], Directory: Gender File: jmjaffe@research.haifa.ac.il.

Kantrowitz, B. (1994, May 14). Men, women, computers. Newsweek, pp. 48-53.

Knupfer, N.N. (1996). Technology and gender: New media with old messages. In Beeldenstorm in Deventer: Multimedia education in praxis. Selected papers from the 4th International Research Symposium on Visual Verbal Literacy. The Netherlands.

Knupfer, N.N. & others. (1997). Gender equity on-line: Messages portrayed with and about the new technologies. In VisionQuest: Journeys toward visual literacy. Selected readings from the annual conference of the International Visual Literacy Association. Cheyenne, WY. (ERIC: ED 408 994)

Knupfer, N.N & others. (1997). Out of the picture, out of the club: Technology, mass media, society, and gender. In VisionQuest: Journeys toward visual literacy. Selected readings from the annual conference of the International Visual Literacy Association. Cheyenne, WY. (ERIC: ED 408 992)

Kramarae, C., & Treichler, P.A. (1990). Power relationships in the classroom, In S.L. Gabriel & I. Smithson, (Eds.), Gender in the classroom: Power and pedagogy (pp. 41-59). Urbana, IL: University of Illinois Press.

Ma, Ringo. (1996). Computer-mediated conversations as a new dimension of intercultural communications between East Asian and North American college students. In S.C. Herring, (Ed.), Computer-mediated communication: Linguistic, social, and cross-cultural perspectives (pp.173-186). Philadelphia, PA: J. Benjamins.

McConnell, D. (1997). Interaction patterns of mixed sex groups in educational computer conferences. Gender and education, 9 (3), 345-363.

McDowell, E.E., & Schuelke, L. D. (1998). An investigation of the relationships among technology experiences, communication apprehension, writing apprehension and computer anxiety. Paper presented at the annual meeting of the National Communication Association. New York, NY. (ERIC: ED 425485)

McGrath, C. (1998). A new voice on interchange: Is it talking or writing? Implications for the teaching of literature. Journal of Educational Technology, 26 (4), 291-297.

Ory, J.C. (1997). Gender similarity in the use of and attitudes about ALN in a university setting. Journal of Asynchronous Learning Networks 1 (1), 16 pps.

Pearson, J.C., West, R.L., & Turner, L.H. (1995). Gender & communication. (3rd ed.). Dubuque, IA: Brown & Benchmark.

Ross, J. A. (1998). Differential participation of males and females in a computer-mediated communication course. Canadian Journal of University Continuing Education, 24 (1), 83-100.

Savicki, V., Kelley, M., & Lingenfelter, D. (1996). Gender, group composition, and task type in small task groups using computer-mediated communication. Computers in Human Behavior, 12 (4), 549-565.

Shea, P. (1999) Student Satisfaction and Perceive Learning with Online Courses: A Preliminary Analysis of Spring 1999 Data. For presentation at the Asynchronous Learning Conference, October, 1999.

Wojahn, P.G. (1994) Computer-mediated communication: The great equalizer between men and women? Technical Communication, fourth quarter, 747-752.